Rocky Flats
Environmental Technology Site

4-R78-WWO-001

REVISION 0

WASTE WATER OPERATIONS FREEZE PROTECTION

APPROVED BY: _____ / R. P. Dunn / 11/8/95
Liquid Waste Operations Manager | Print Name | Date

Responsible Organization: Liquid Waste Operations Effective Date: 11/20/95

CONCURRENCE BY THE FOLLOWING DISCIPLINES IS DOCUMENTED IN THE PROCEDURE HISTORY FILE:

SME
Engineering
Industrial Hygiene and Safety
Quality Assurance
Waste Water Operations

USE CATEGORY 3

ORC review not required

The following have been incorporated in this revision:
95-DMR-001069

Periodic review frequency: 4 years from the effective date

Reviewed for Classification/UCNI

By G. Sprenger /s/ UNU

Date 10/11/95

LIST OF EFFECTIVE PAGES

Pages	Effective Date	Pages	Effective Date
1	11/20/95		
2	04/16/96		
3-7	11/20/95		
8-10	04/16/96		
11-12	11/20/95		
13	11/30/95		
14	11/20/95		

The following DMR is active for this procedure.

95-DMR-001337
96-DMR-000401

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1. PURPOSE

The purpose of this procedure is to set forth the requirements and responsibilities for inspection of Waste Water Operations buildings to prevent freezing of water lines and process lines. Additionally, in the event of a freeze problem, this procedure will provide early identification to initiate proper corrective actions.

2. SCOPE

This procedure applies to all buildings and facilities under the Waste Water Operations areas of responsibility and is to be followed by all Waste Water Operations personnel. This procedure identifies support required to implement the Freeze Protection Program requirements throughout the following three phases:

- Pre-Cold-Winterization Inspections and Maintenance (July through September).
- Cold Weather Inspections and Actions (October through March).
- Post-Winter Assessment and Corrective Actions (March through October).

This includes the following buildings:

Waste Water Treatment Plant (WWTP): Buildings	995	974
	988	T974A
	990	990A

Sanitary Waste Operations Facilities do not have any fire sprinkler systems. The sewage treatment facilities are heated via a gas heater and a Carrier heat pump system at Building 995, and an electric heater in Building 988. Building 990A does not contain any heating capabilities. Most of the WWTP process systems are not contained within buildings and thus are exposed to the environment.

3. RESPONSIBILITIES

Waste Water Operations Manager has overall responsibility to have all buildings under his control periodically inspected to prevent water-line and utility-system freeze protection problems.

The inspections of the WWTP Facilities will be performed by WWTP Operators who are on duty 24 hours a day. This inspection will include Buildings 995, 990, 990A, 974, T974, and 988.

Specific freeze protection problems will be identified in the Plan of the Day meetings.

The Waste Water Freeze Protection Plan program manager will provide a report monthly to the Site Program Manager.

4. INSTRUCTIONS

NOTE *For the purpose of this procedure, an inspector is the individual performing the inspection.*

4.1 Pre-Cold-Weather Inspections (July through September)

Manager

[1] Prior to freezing weather (September to October), assign an individual to perform inspections of all buildings.

[2] Ensure all antifreeze in heating, cooling, and fire suppression systems is checked (prior to October 1st); this includes testing, inspecting, and replacement of antifreeze solution if applicable.

Inspector

[3] Inspect all buildings for the following:

- Heating systems operability.
- Windows, doors, and building integrity weather-proofed to prevent cold air infiltration.
- Heat tape required to ensure adequate freeze protection is checked for proper operation.
- Location and accessibility of main water isolation valves for each building.

[4] Document inspections on Appendix 1, Pre-Cold-Weather Inspection Checklists.

[5] Route the results of the inspection to the manager or designee for review and action.

Manager

[6] Review the inspection results, identify problem areas, and required repairs, and prepare an Integrated Work Control Form to implement corrective actions.

[7] Provide a copy of the completed Pre-Cold-Weather Inspection Checklist and a copy of the preventive maintenance report to Waste Water Technical Support Freeze Protection Point of Contact prior to October 1st.

4.2 Cold-Weather Actions (October through March)

NOTE 1 *Operations personnel need to be aware of cold areas in the buildings that could cause freezing.*

NOTE 2 *Inspections are to be performed to ensure building temperatures remain above 40 degrees F.*

NOTE 3 *The respective area managers are responsible for establishing a list of problem freeze protection areas which require a higher frequency of inspection.*

Manager or designee

[1] **WHEN** the outside air temperature drops below 20 degrees F,
THEN:

[A] Ensure inspections have commenced.

Inspector

[B] Perform inspection of all buildings (990, 990A, 995, 988, 974, T974A) and surrounding areas at least daily, using guidance on Page 2 of Appendix 2.

[C] Perform inspections in problem areas at least once per shift in accordance with Appendix 2, Freeze Protection Inspection Sheet for WWTP.

[D] Document inspections on Appendix 2.

Annotate date, inspection number, and temperatures on top half of sheet, with inspection check off, initials, and comments on the bottom of the sheet.

[E] Immediately notify the Manager or designee of all freeze protection problems.

[F] **IF** immediate notification can not be made,
THEN contact the Utilities Shift Coordinator or the Shift Superintendent for assistance to mitigate the consequences of the freeze problem.

4.2 Cold-Weather Actions (continued)

[G] Route the results of the inspection to the Manager or designee for review,

[H] Record WWTP Inspections in the WWTP shift log and Plant Check/Turnover Sheet; include the following along with the entry:

- Outside air temperatures
- Inspection findings
- Immediate corrective actions initiated
- Personnel notified in the event of a problem

[I] **IF** all electric power is lost and not expected to be available in the next 30 min,
THEN:

[a] Ensure the sulfur dioxide (SO_2) feed system is drained.

SO_2 feed system is the pump and the feed lines in the cabinet.

[b] Ensure the chlorine feed system is drained.

The chlorine feed system is the pump lines, feed lines in the cabinet, and the tertiary lines to the basin.

[c] Attach a garden hose to the Building 974 hose connection and run the garden hose to the drain north of Building 974.

[d] Commence bleeding (small stream) of water into the drain.

[2] **WHEN** the outside air temperature drops below 0 degrees F,
THEN:

[A] Inspect all areas at least once per shift, using guidance from Page 2 of Appendix 2.

[B] Inspect problem areas twice per shift in accordance with Appendix 2.

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4.2 Cold-Weather Actions (continued)

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[C] Document inspections on Appendix 2.

Annotate date, inspection number, and temperatures on top half of sheet, with inspection check off, initials, and comments on the bottom of the sheet.

[D] Immediately notify the Manager or designee of all freeze protection problems.

[E] **IF** immediate notification can not be made,
THEN contact the Utilities Shift Coordinator or the Shift Superintendent for assistance to mitigate the consequences of the freeze problem.

[F] Route the results of the inspection to the Manager or designee for review,

[G] Record WWTP Inspections in the WWTP shift log and Plant Check/Turnover Sheet; include the following along with the entry:

- Outside air temperatures
- Inspection findings
- Immediate corrective actions initiated
- Personnel notified in the event of a problem

Manager or designee

[3] **IF** any freeze protection problems are identified,
THEN initiate corrective actions immediately to eliminate the freezing conditions.

The following list includes examples of actions to be taken. Actions should not be limited to this list.

- Eliminating the source of cold air.
- Utilizing portable heaters to warm the area.
- Running water to prevent freezing lines.
- Returning heating systems to operation if not working correctly via maintenance work orders. Use a priority level 1 if necessary to correct any immediate freeze problems.
- Isolate water to building and drain the building's water lines as much as possible.

4.2 Cold-Weather Actions (continued)

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[4] Review the inspection results, identify problem areas and required repairs, and prepare an Integrated Work Control Form to implement repairs.

[5] Provide monthly reports of cold-weather checks performed and 'Corrective Action Status' to Waste Technical Support Freeze Protection Point of Contact, starting November 1st through April 1st.

4.3 Post-Winter Assessments (March through October)

Manager or designee

[1] Perform a comprehensive assessment of all freeze protection occurrences from the prior winters in accordance with 1-74000-WFPP-001.

[2] Identify corrective actions for freeze protection occurrences in accordance with 1-74000-WFPP-001.

[3] Provide monthly status reports of:

- All Engineering and Maintenance evaluations.
- Freeze protection corrective actions.
- Completions of actions to the Program Manager.

5. RECORDS

Appendix 1 and 2 are Quality Assurance Records generated by this procedure.

- Appendix 1, Pre-Cold-Weather Inspection Checklist
- Appendix 2, Freeze Protection Inspection Sheet for WWTP

Operator

[1] Sign and date Appendix 1 and 2, as applicable.

[2] Forward Appendix 1 and 2, as applicable to the Manager.

Manager

[3] Review Appendix 1 and 2 for completeness.

[4] Disposition Appendix 1 and 2 as a Quality Assurance Record in accordance with 1-77000-RM-001, Records Management Guidance for Records Sources.

6. REFERENCES

1-74000-WFPP-001, Winterization and Freeze Protection Program

1-77000-RM-001, Records Management Guidance for Record Sources

APPENDIX 1
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PRE-COLD-WEATHER INSPECTION CHECKLIST

Building Number _____

Inspected By _____

Date _____

	Yes	No	Not Applicable
Heating System Operable	( )	( )	( )
Comments			
Windows/Doors Closed	( )	( )	( )
Comments _____			
Openings in Outside Walls	( )	( )	( )
Comments _____			
Heat Tape Operable	( )	( )	( )
Comments _____			
Insulation on Piping and Walls	( )	( )	( )
Comments _____			
Main Water Isolations Accessible	( )	( )	( )
Comments _____			

Reviewed
By:_____ Date:_____

APPENDIX 2
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FREEZE PROTECTION INSPECTION SHEET FOR WWTP

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TEMPERATURE READINGS DATE:_____ INSPECTION #:_____

Enter temperatures in spaces provided:	MIDS	DAYS	PM'S
Ambient air temperature ≤ 20 °F			
Temperature at lab sink in Bldg. 995			
Temperature in basement of Bldg. 995			
Temperature at sand filter pumps, Bldg. 988			
Temperature inside - west end of Bldg. 974			
Temperature inside - east end of Bldg. 974			
Temperature at belt filter press, Bldg. T974A			
Temperature in chem feed shed, Bldg. 974			
Temperature in lime feed shed			
Temperature inside Bldg. 990			

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VISUAL CHECKS

Enter SAT, UNSAT or N/A in spaces provided:	MIDS	DAYS	PM'S
Cl_2 feed system and analyzer			
SO_2 feed system and analyzer			
Drying bed fill lines			
Tanker fill line and valve			
Heat on in chemical feed shed Bldg. 974			
Heat on in lime feed shed			
Heat tape breakers ON, Bldg. 995			
General outside piping			
Heat tape breakers ON, Bldg. 988			
Filtrate pump, Bldg. T974A			
Belt filter press wash pump			
Blower lines at Bldg. 990			
INITIALS:			

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COMMENTS:_____

Reviewed
By:_____ Date:_____

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FREEZE PROTECTION INSPECTION SHEET FOR WWTP
INSPECTION GUIDANCE

Prior to the freeze inspection, review the Shift Orders to ensure freeze problems or actions required are understood. These problems should also be discussed in the watch turnover, when applicable.

1. Ensure all heat to buildings or processes are restored.

2. Check all areas to be certain sufficient heat is being provided. Additional heat should be provided to ensure all buildings/areas susceptible to freeze problems remain above 40 degrees F. These buildings include 995 and 988.

3. Inspect snow buildup on the rooftops. Special concern should be provided for flat roofs in order to ensure the roof loading is not exceeded.

4. Doors, windows, ventilators, and other openings should be weather-tight.

5. Clearances are maintained between heating system components and any combustibles.

6. Snow buildup is cleared from access ways, control valves, hydrants, building vents, and all other essential equipment required to permit effective facility operations.

7. Inspect all roof drains to ensure there is no ice buildup.

8. When temperatures begin to rise after cold weather, areas within the buildings should be promptly inspected to detect any cracks or leaks in piping or building structures.

9. A detailed inspection of the process systems must be performed each time a process change is made. Ensure all tanks and clarifier basins are filled with water if potential freezing problems exist. If ice buildup around the top of the clarifiers prevents adequate inspection of the process, remove the ice by diverting flow or spraying water.